

# DUOBAT 120+ BATTEN SPORTS FLOOR SPECIFIER'S AND INSTALLATION INSTRUCTIONS

## 1. SPECIFIER'S INSTRUCTIONS

### 1.1 SYSTEM SPECIFICATION

#### INFORMATION

#### DUOBAT 120+ BATTEN SYSTEM

D 1.0	General information Junckers sports floors
D 7.1	Specifier's- and Installation Instructions

Junckers Duobat 120+ Sports Floor System is based on 22 mm solid hardwood floor boards nailed to a resilient subfloor of two layers of crosswise-laid prefabricated battens.

For optimum shock absorption the top batten has pre-attached resilient rubber pads that snap-lock into the lower batten's J-lock cradles. This ensures a fast, accurate and secure connection between the upper and lower battens.

The floor system is mainly for use on an uneven sub floor and is therefore delivered with an adjustable and locking DuoWedge cradle, making it easy to correct even the most complicated subfloors into flat, ideal playing surfaces. Levelling the floor is conducted without use of nails and tools.

Table 1

Packing blocks fitting the adjustable DuoWedge cradle are available in a variety of thicknesses (20, 30, 40, 50 mm) to easily increase the height of the floor system as needed. Use a maximum of 2 packing blocks per wedge.

**Batten distance:** Upper batten is laid with c/c 336.4 mm. Lower batten is laid with c/c 400 mm.

#### Start batten and battens along walls:

To avoid deflection of the floor along the walls, special battens are part of the system:

- A Gable Batten 39x40 mm to be placed along walls parallel with the shortest side of the room.
- A Face Wall Batten 39x40 mm to be placed along walls parallel with the longest side of the room. This including wooden blocks 40x60x14 mm to connect crossing battens with the Face Wall Batten.
- Special battens, called Start Battens 39x40, as help to get started with the correct staggering of the Lower Battens.

**Constructions height:** From 120 mm - 242 mm.

**Performance:** The floor system is an area elastic sports floor with a high level of shock absorption and resilience. Very suitable for multifunctional sports halls and arenas. Junckers Duobat 120+ is tested and approved according to the European Sports Norm EN 14904.

#### Step sound reduction by installation on heavy constructed horizontal divisions:

22 mm floor boards on Duobat battens and 50 mm insulation: 25 dB.

22 mm floor boards on Duobat battens: 25 dB.

For general information about sound and practical guidelines on acoustics in floor constructions, see E 5.0.

**Read all information:** Please note that full documentation of this floor system comprises General information, Specifier's and Installation instructions, see table 1. By questions, please contact Junckers Technical Service.

## 1.2 FLOOR COMPONENTS - DUOBAT 120+ BATTEN SYSTEM

1. **Junckers 2-strip solid hardwood floorboards for sport**  
 Thickness x width x length  
 22 x 129 x 3700 mm

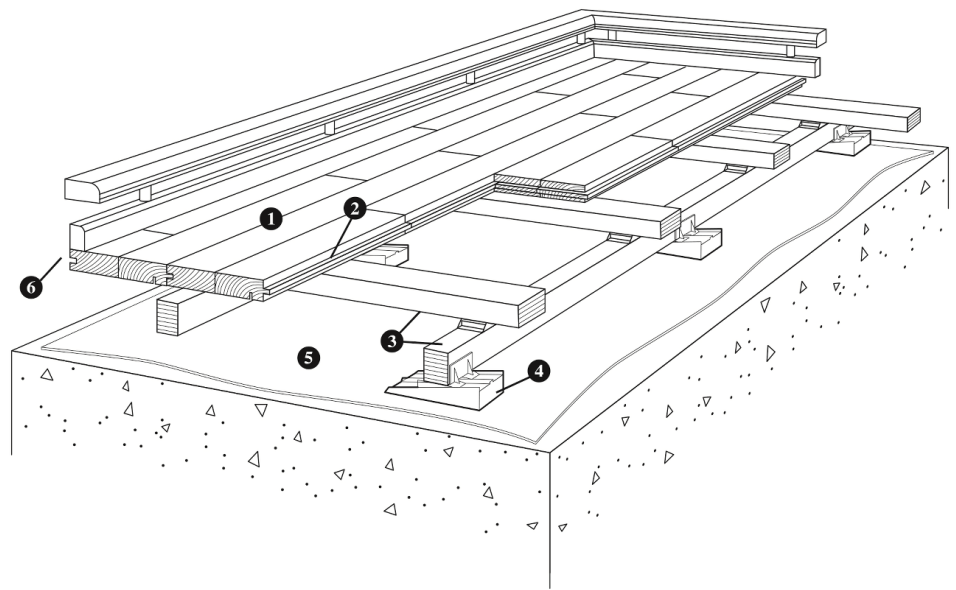
Wood Species, grade and surface:  
 See data sheet B 2.0

2. **Junckers J-Nails (Machine nail)**  
 2,2 x 45 mm special developed J-nails with a high shearing- and pull out strength.
3. **Laminated battens with J-lock resilient rubber pads**  
 Upper batten: 25,5 x 60 x 3600 mm,  
 c/c 336,4 mm.  
 Lower batten: 39 x 40 x 3364 mm,  
 c/c 400 mm

Duobat 120+ battens are made of spruce with a moisture content of 8-10 %.

12 mm shock absorbing rubber pads pre-attached on upper batten, and a J-Lock cradle pre-attached on lower batten.

4. **Packings**  
 Junckers adjustable DuoWedge
5. **SylvaThene moisture barrier**  
 0,20 mm PE-foil.
6. **Expansion gap at the wall**  
 1.5 mm per metre width on each side and 1 mm per metre length at each end, but both min. 30 mm.  
 Is also required at fixed points, e.g. column.



**Fig. 1**

## 1.3 LOAD BEARING STRENGTH

The System is designed to ensure good technical properties in relation to the expected loads in connection with sports activities.

In order to prevent damaging deflections, a stop is built into the floor system. This is being activated at high loads. The stop has no function during normal sports use.

### Bearing capacity at point loads

The Duobat 120+ batten system is tested and approved for maximum point loads, in relation to load area.

Table 2 shows the maximum load-bearing capacity from point loads at the batten system's recommended batten distances and at given loading areas.

Table 2	
∅ 25 mm: 4,5 kN (approx. 450 kg)	100x100 mm: 6,0 kN (approx. 600 kg)

Table 3 shows use of the floor system in relation to the load classes in EN 1991-1-1, corresponding to load bearing requirements and the floor having acceptable stiffness. Furthermore the applicability of the floor system in relation to wheel load is noted.

For further definition of load classes and types, see General Information Junckers sports floors D 1.0 - Stiffness and loadbearing strength.

Table 3	Loading types	
	Area- and Point load	Wheel load
Loading category		
C4: Assembly halls for physical activity, e.g. gyms/theatres	Approved*	Approved**
C5: Assembly halls which can be crowded, e.g. sports halls incl. stands	Approved*	Approved**

\* Point load area min. 200 x 200 mm / \*\* Wheel loads, see D 1.0 - Table 2

## 1.4 FLATNESS OF THE SUBFLOOR

Battens must be straight with no distortion.

After installation the top surface of the battens may deviate a maximum of 2 mm from flat level under a 1.5 m straight edge (UK: 3 mm under a 2 m straight edge), both across and along the individual battens.

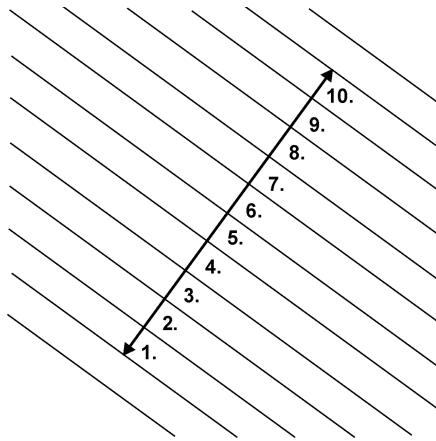


Fig. 2

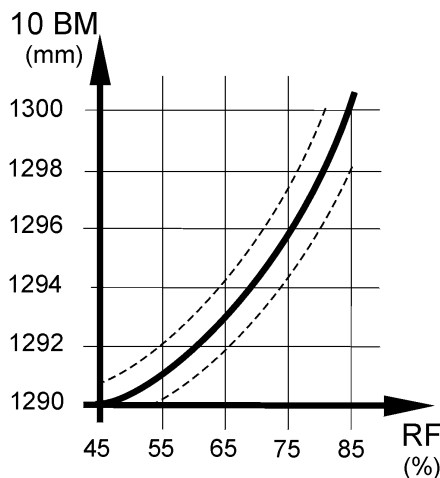


Fig. 3

## 1.5 THE 10-BOARD RULE - AVOID STRESS AND GAPS

In order to minimize stress or gaps in the floor due to fluctuations in the climatic conditions within the building, floorboards must be laid according to a 10-board rule.

This indicates the measurement across 10 floorboards when laid and should be checked continuously during the installation and afterwards, see Fig. 2.

To keep the 10-board measurement (10 BM), it is recommended to use Junckers temporary spacers during installation of the floor. Spacers are delivered in a range of sizes to suit the expected relative humidity of the room.

The 10-board measurement is chosen on the basis of the expected maximum relative humidity in the building when in use throughout the year, see fig. 3.

The graph illustrates the 10-board rule in relation to the relative air humidity for 129 mm wide floorboards. E.g. an expected relative humidity of max. 65 % RH will normally require a 10-board measurement of approx. 1294 mm.

The outer limits of the 10-board measurement, which also depend on the floor size, are marked with dotted lines.

The size of the floor, as well as its location, i.e. ground floor or floor horizontal division, may also have influence on the choice of the 10-board measurement.

For further information please contact Junckers technical service department.

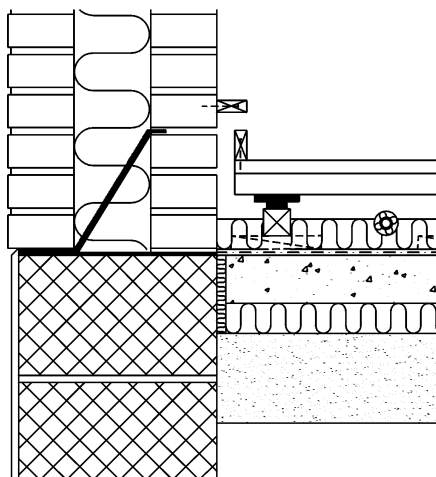


Fig. 4

## 1.6 THERMAL INSULATION AND PIPES IN THE SUBFLOOR

The batten system provides good opportunity to incorporate thermal insulation.

There must be sufficient ventilation between the underneath of the floor boards and the insulation. This to prevent fungal attacks in the flooring construction.

All central heating, cold and hot-water pipes under floors must be carefully insulated using at least 20 mm mineral wool or similar.

It must be ensured that there is sufficient space between underneath of the floor board/batten and the pipe insulation to allow for unimpeded vertical movement of the floor, see Fig. 4.

## 1.7 MOISTURE PROTECTION

### Concrete subfloors

The residual moisture contained in the concrete or screed must not exceed 90 % RH.  
(In UK: Concrete moisture max. 75 % RH acc. to BS 8201.

At ground level and other upper levels, protection against moisture both from within the building and from the ground is required.

A moisture barrier is established by laying a damp-proof membrane, 0.20 mm PE membrane or 1000 g polythene, e.g. Junckers SylvaThene moisture barrier, directly on the concrete before laying out the battens, **see Fig. 4 (dotted line)**.

### Wooden subfloors

For renovation projects where new floor systems are laid on existing wooden subfloors, it must be ensured that the entire structure has been designed to the correct specifications regarding moisture.

Usually, no additional moisture protection must be applied on top of the existing sports floor, as this may course the risk of fungal attacks in the subconstruction.

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## 1.8 VENTILATION OF THE SUBFLOOR

In general, batten sports floor systems should be installed using skirtings with ventilation slots, to ensure adequate ventilation of the substructure. Moreover, to minimize the consequences of environmental fluctuations in the building as much as possible, the same climate should be maintained both above and below the floor surface.

The expected relative humidity range will usually be complied with through natural ventilation via the aforementioned ventilation slots. By natural ventilation we mean the air flow will be as a consequence of movement of the floor surface during normal sports activities.

In all circumstances it is important that the ventilation slots at the walls be retained and that the moisture-protection instructions are observed, **see section 7 - Moisture protection**.

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## 1.9 NET CONSUMPTION OF MATERIALS

Net consumption for 1000 m<sup>2</sup> DuoBat 120+ batten system (Length x width = 40 x 25 m):

**Floor boards:** 1,000 m<sup>2</sup> + approx. 2 % wastage

**J-nails:** 2,2 x 45 mm: 25,000 pcs.

**Duobat 120+ lower batten:** 2,400 rnm + 2% wastage.

**Duobat 120+ upper batten:** 2,975 rnm + 2 % wastage.

**Start batten:** 62 pcs.

**Gable batten:** 2 x room width = 50 rnm.

**Face Wall Batten:** 2 x room length = 80 rnm.

**Wooden blocks for Face Wall Battens:** 240 pcs.

**Exstra J-Lock shock pads:** 100 pcs.

**DuoWedges:** Approx. 4,500 pcs.

**Loose tongues:** Approx. 70 pcs.

**Junckers SylvaThene moisture barrier, min. 0,20 mm PE-folie:** 1,100 m<sup>2</sup> wastage included.

**Junckers Sylvafix Header joint adhesive:** 3 bottles (3 x 0.75 litre)

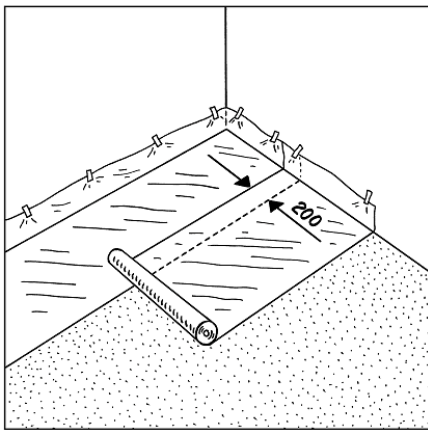
## 2. INSTALLATION INSTRUCTIONS

### WHEN TO START INSTALLATION

The building must be weather tight. The heating system must be installed and tested, and during the heating season there should be a constant heat supply. Cast concrete elements, including casting of sockets for fixtures and fittings, screeding and other wet trades which can contribute moisture to the building, e.g. priming of paintwork, must also be completed.

The relative humidity in the building must be between 35-65 % RH (UK) and the temperature approx. 16-20 °C. The residual moisture contained in the concrete or screed must not exceed 90 % RH. (UK: 75 % acc. To BS 8201). In wooden based sub floors the moisture content should not exceed 12 %.

Solid floor boards should always be laid immediately after arrival at the building. The wrapping of the floor boards must not be removed until just prior to laying the floor, i.e. no acclimatising of the boards on site must take place.



#### 2.1 MOISTURE BARRIER

On sub floors of concrete a moisture barrier of min. 0.20 mm PE membrane is laid, e.g. Junckers SylvaThene moisture barrier.

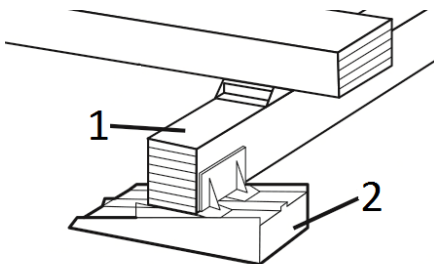
The moisture barrier is laid with an overlap of 200 mm at all joints, continuing up walls, etc.

The polythene has to be taped at all lap joints.

#### 2.2 EXPANSION GAPS AT WALLS AND FIXED OBJECTS

The minimum expansion gap at walls and fixed objects must be 30 mm in order to allow for movement of the floor, but also to provide for ventilation of the substructure. In the case of especially wide spans it may be necessary for a gap of more than 30 mm to be formed.

This is calculated at 1.5 mm per m width at each side and 1 mm per m length at each end of the floor. For floors less than 10 m wide the minimum expansion gap size can be reduced to 15 mm. The gap between wall and floor is covered with Junckers combi sports skirting.

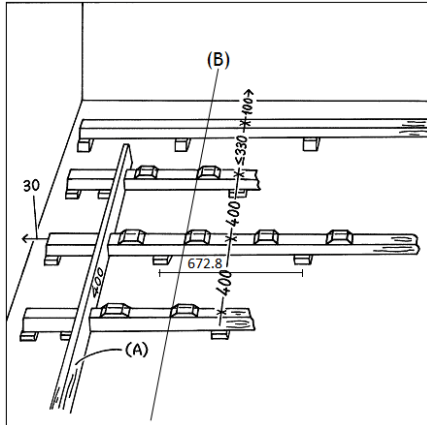


#### 2.3 ATTACHING WEDGES TO THE LOWER BATTENS

Before laying of the lower battens (1), the enclosed DuoWedges (2) are clipped-on onto the lower battens where marked (6 pcs. per batten).

Face Wall Battens:

Each batten gets 7 wedges corresponding to a distance between wedges of approx. 570 mm.

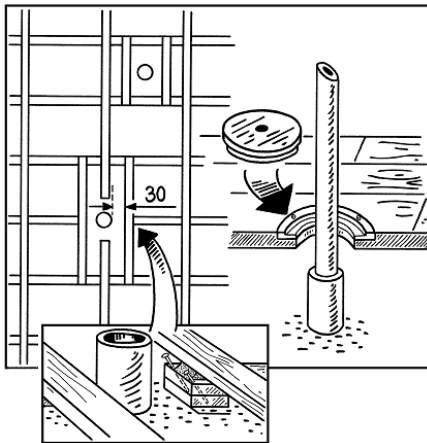


## 2.4 LAYING OF LOWER BATTENS

The lower-battens are laid parallel to the longest side of the room. The first and last row of battens is laid with a distance of 100 mm from the wall to the centre of the batten (Note that these are special battens called Face Wall Battens, without J-Lock elements, and marked with red tape on the bundles).

The first batten, in each of the remaining rows, is special made battens called Start Battens (marked with green tape on the bundles). These are delivered in two lengths and are always used, by turns, as a starter in a new row. All the start battens are laid keeping 400 mm centre to centre, by the Spacing Batten ((A) marked with black tape on the bundles).

The distance of max. 330 mm between the first and second batten row in each side of the hall are equalized. Keep 30 mm distance from wall to the end of the start battens and straighten up the J-Lock elements on a line by using a string (B). When all start battens are laid, the Lower Battens are laid in continuation of these. Fit the last batten in each row, and use the waste as extra battens at net posts, pipes, etc.

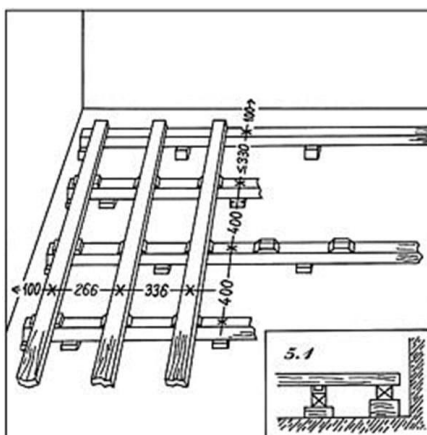


## 2.5 BATTENS AT NET POSTS, PIPES ETC.

Place extra loose battens at net posts, pipes, etc. Loose battens must be elastic, see section 2.7.

Distance to all walls, net posts, pipes etc., see section 2.2.

The position of the lower battens must ensure that the floor boards are laid parallel to the longest side of the room.



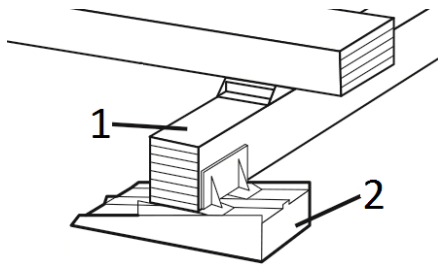
## 2.6 LAYING OF UPPER BATTENS

Upper battens with mounted resilient pads are laid. The first and last batten rows are laid at a distance of 100 mm from the wall to the batten centre (Note that these are special battens called Gable Battens, without shock pads, and marked with red tape on the bundles). The second batten row is clipped-on to the lower battens, by the premounted J-Lock cradle, centred at 266 mm to the first batten row. All following batten rows are centred at 336.4 mm.

To control the direction of – and distance between – the lower battens, every 5. row should be clipped-on to the lower battens as a start. Before installing the remaining upper battens, levelling of the substructure could be done more easily, see section 2.7.

Note: Each end of a batten row must be fixed to the face wall batten, with an intermediate wooden block, (do not use a shock pads) see drawing 5.1. The wooden blocks are delivered separately in boxes. Batten end joints must not be in a line, but must be staggered 2 batten bay as a minimum.





## 2.7 LEVELLING THE SUBCONSTRUCTION

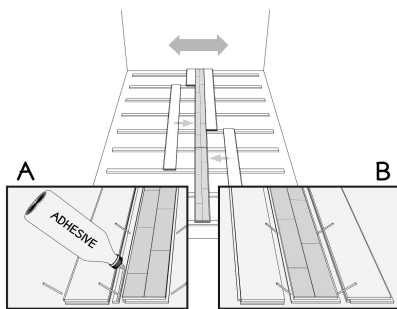
The lower battens (1) are levelled using the wedges (2). Extra wedges are mounted in each end of the batten rows, where the last batten is fitted by the wall.

On a subfloor levelled to a tolerance of no more than a 2 mm gap showing under a 1.5 m straight edge (UK: 3 mm under a 2 m straight edge) the substructure can be laid without levelling, see D 1.1 - Flatness of subfloor.

Above mentioned wedges can be used either alone or in combination with bases (available in 20, 30, 40 and 50 mm), to achieve the right floor level/height. Use no more than 2 bases under each wedge.

## 2.8 LAYING OF FLOORBOARDS

If the floor is more than 12 m wide the installation must begin in the middle of the sports hall. Use one of the following two methods:



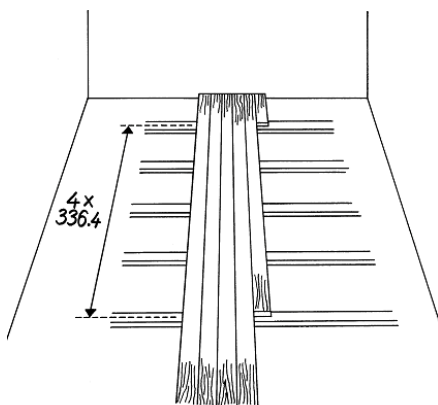
- A. The two centre floorboards are joined with a loose tongue which must be glued to one of the floorboards in the full length of the floorboard.
- B. Use Junckers CenterRow boards. These floorboards are constructed with a tongue on both sides.

The floorboards are laid in a continuous pattern with well-defined distribution of board header joints from row to row of 4 x the batten centres, i.e. 1345.6 mm. In that way that all floorboard header joints are supported. The floorboards are secretly nailed, see section 2.10.

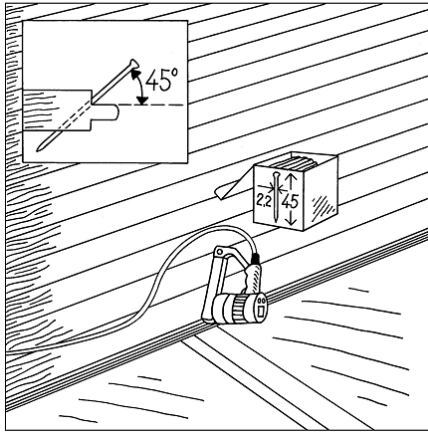
## 2.9 DISTANCE, BOARD HEADER JOINTS

All board header joints must be fully supported and all boards must be laid in the pattern shown in the drawing.

NB: The distance between board header joints in two consecutive rows must be 4 x 336.4 mm = 1345.6 mm, as shown in the drawing.







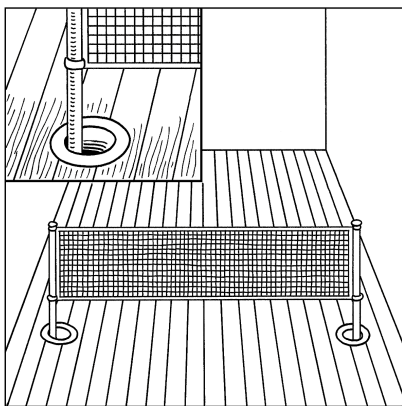
## 2.10 NAILING

Use Junckers machine J-Nails, 2.2 x 45 mm. The floor boards are secretly nailed at an angle of 45°. Do not nail closer than 50 mm to stave joints and never in the board end joints. To avoid creaking, the boards are pressed down on the battens while they are nailed.

The distance between the floorboards and walls/vertical fixed installations is calculated as 1.5 mm per running metre of floor width on each side, and at end walls 1 mm per running metre of floor length, with an overall distance of minimum 30 mm.

The first and last rows of boards installed must be face nailed or screwed and then covered with matching filler.

**TO AVOID STRESS AND GAPS, REMEMBER DURING THE INSTALLATION TO WATCH THE FIXED 10-BOARD MEASUREMENT.**

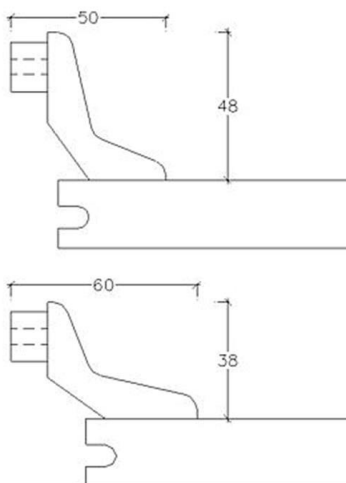


## 2.11 BUSHINGS

On mounting of bushings in the surface of the floor the internal diameter of the bushing must exceed that of the pipe, i.e. the external diameter of the net pole, by at least 40 mm.

At the outermost zones of the floor all bushings are mounted eccentrically towards the middle of the floor in relation to the sockets in the concrete, **see small drawing**.

Floor rosettes must be mounted to allow both vertical and horizontal movement of the floor to take place unimpeded.



## 2.12 COMBI SPORTS SKIRTING

Junckers Combi Sports skirting can depending on the wanted cover width be mounted upright or in a lying position, see figure.

The foot of the skirting must lie flat and be in contact with the floor. End joints may be either butt jointed together or cut as a 45° mitre joint to enhance the visual effect of the joint.

The skirting can be either glue fixed to the walls or screw fixed.

Do not fix the skirting to the floor and ensure that the skirting is not exerting any downward pressure on the floor.